The SKIMMER

News of the Delaware National Estuarine Research Reserve

Volume VIII, No. III
Fall 2003

The Delaware National Estuarine Research Reserve (DNERR) is one of 25 designated reserves across the country.

The program is a federal-state partnership whose goal is to establish, protect and manage natural estuarine habitats for research and education.

Delaware's Reserve consists of two components, the St. Jones River and Blackbird Creek.

These sites include both brackish and fresh water estuaries and represent the diverse estuarine ecosystems found throughout the Mid-Atlantic.

Inside

Message from the Reserve Manager

Dear Friends,

I take great pleasure in writing to you for the first time in a year as Manager of the Reserve. I returned from Southwest Asia in May and came back to the Reserve in June. I am happy to relate that all members of the 153rd Military Police Company of the Delaware Army National Guard returned safely.

Some of you may not know that in my absence our Education Coordinator pulled double duty and served as acting Manager as well. The Reserve was run so well that I have found it incredibly easy to slip back into the swing of things.

With all that said our field season is coming to a close very quickly and our education program is gearing up for the start of the school year. An interesting project on the horizon is that we are looking to add a coordinator of volunteers. The coordinator will be training volunteer educators as well as developing rewarding service projects for interested groups. So if you have any interest in the natural sciences and helping with our research, education or stewardship programs please contact me at (302) 739-3436.

Another exciting development is the completion of our building expansion. We moved in on August 15th. We have excellent new meeting facilities and overnight quarters for visiting researchers. As Summer turns to Fall I hope you have the opportunity to visit us and enjoy the natural beauty of the Reserve.

Mark Del Vecchio

Delaware National Estuarine Research Reserve Expands!

The Delaware National Estuarine Research Reserve is pleased to announce the opening of the new wing to its Visitor Center located at the St. Jones Component, south of Dover. The addition adds 1700 sq. feet of meeting space and visiting researcher quarters. Within the last three years, the amount of activity

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DNERR's new wing

DNERR Expands, con't.

at the Reserve has increased tremendously. It has become an ideal meeting location just outside the Capitol in a beautiful natural setting.

The Reserve identified the need for more meeting space as a result of the growing education program and the amount of visitors to the Reserve. Currently approximately 5,000 school children and 1,000 meeting attendees visit the Reserve each year. In the past, any gathering of over 10 persons would require the entire large conference area. This denied the public access to many educational displays. The new meeting room is sized to handle our most common group size. It can accommodate groups of 18 behind tables and 25 in row seating.

In the past the Reserve lost potential researchers due to a lack of short term sleeping facilities. There are now four dormitory style rooms that are able to sleep a total of 12. This new space allows the Reserve to draw in more partners to conduct on-site research as well as host small meetings. Please contact the Reserve at (302) 739-3436 for more information about reservations.

Mark Del Vecchio

New conference room

The DNERR Welcomes Two New Graduate Research Fellows

The National Estuarine Research Reserve System offers qualified master's and doctoral students an opportunity to address scientific questions of local, regional, and national significance through its Graduate Research Fellowship program. All Graduate Research Fellow (GRF) projects must be conducted in a Reserve and must enhance the scientific understanding of a Reserve's ecosystem. While GRFs receive hands-on experience, reserve managers and coastal decision-makers receive vital ecological data. Two students per year are selected for each Reserve. Funds are available for up to three years with the amount of each award at $17,500 per annum. For more information, visit www.ocrm.nos.noaa.gov/grf.

Anne Mundel

I am a 2001 graduate of the University of Delaware with a major in Environmental Science and minors in Geology and Philosophy. My long-term goal, after completing by Master's degree, is to pursue a Ph.D. program in geology. The knowledge and experience gained during the attainment of these credentials would allow me to either teach and pursue research at a college/university or work in the private sector. My principal desire is to increase public awareness of how human activity and development impact water quality and availability.

Within the broad field of geology, an area of special interest to me is the hydrogeology of estuarine and fresh water systems. As the Earth's population increases, human activity impacts coastal areas resulting in estuarine and fresh water degradation.

A particular subject of interest to me is the environmental impact of golf courses in coastal estuarine settings. Golf courses may manipulate the hydrogeology and nutrient fluxes in the vicinity of a course to such an extent that they may have an impact on water quality and availability. Unbiased studies, not backed by the United States Golf

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Graduate Research Fellows, con't.

Association, would be helpful in determining the impact of these courses on estuarine systems.

My thesis project will directly assess the impact of a major golf course/housing development on the local estuarine watershed. The study is timely in that the opportunity exists for pre-construction determination of the baseline setting of water quality, and then as construction proceeds and new land use commences, any resulting changes can be monitored. This thesis project is part of a larger research effort devoted to studying the impact of suburban development on the local watersheds and their surrounding wetlands in the vicinity of Delaware's National Estuarine Research Reserve. These combined research efforts will provide managers with useful information regarding how suburban development impacts nutrient loading and water quality. This type of information can be used to develop improved best management practices to minimize these impacts on wetlands and estuarine environments.

Michael League

Originally from Pembroke, Massachusetts, Michael League has recently graduated from the University of Delaware with a B.A. in Biological Sciences Education. While an undergraduate, League worked for two summers in the Halophyte Biotechnology Center at the College of Marine Studies in Lewes, Delaware. After completing a spring semester teaching eighth grade science, League began a full time appointment in Lewes as a graduate student under Dr. Jack Gallagher.

Building upon League's work as an undergraduate, he will continue to work on the invasive wetlands plant, *Phragmites australis*. Phragmites expansion has been well documented in the wetlands of the Mid-Atlantic region, especially in Delaware. Current estimates figure that more than one-third of Delaware's marshes are covered by Phragmites. Recent work in the field has suggested that this invasion might be due to human disturbances, eutrophication, or because of an invasive genetic haplotype of Phragmites. The latter suggestion has created a new way of looking at Phragmites, from the genetic perspective.

League's work in the Delaware National Estuarine Research Reserve will focus on analyzing how genetic differences translate to growth differences in the field. Native stands have been identified in the local watersheds surrounding the reserve and sample populations have been moved to a greenhouse in Lewes for further study. The research may shed light on differences between the native and invasive haplotyes, which may lead to methods to control the invasive Phragmites without eradicating the native populations.

In his free time, League enjoys working with children, mountain biking, and kayaking. He is looking forward to working with the education department at DNERR, as it ties together his two passions: science and education.

Your Attention Please!

In an effort to 'save some trees,' we are seeking newsletter recipients who would like to receive an electronic copy of the Skimmer instead of a hard copy. Emailing the Skimmer is not only more environmentally responsible but it will help us cut down on printing and mailings costs, allowing us to spend those saved dollars on research and education programming. Our mailing list has grown substantially over the last two years by collecting names at public events, at the St. Jones Reserve Center, and by your inquiries about our programs. If you would like to submit your email address to receive your Skimmer by way of email, please call the St. Jones Reserve at (302) 739-3436 and leave your request at extension 10. *Thank you.*

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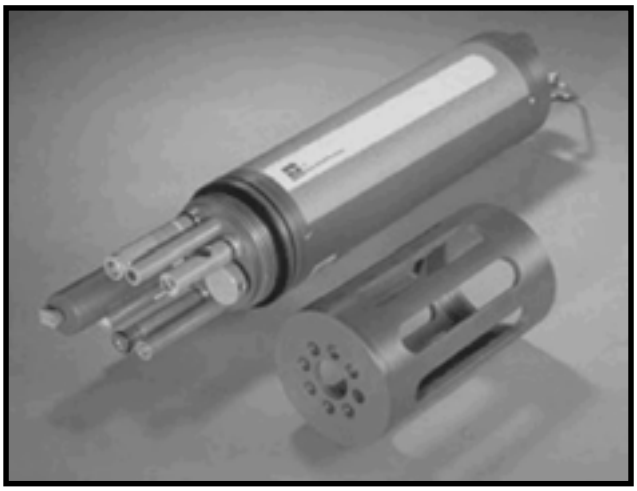
EXPLORING THE "SWMP"

Longtime readers of the Skimmer may immediately recognize the ingenious acronym SWMP. It stands for the System-Wide Monitoring Program, a national monitoring program, which tracks long and short term variability in estuarine environments. A total of 25 different Reserves participate, offering a vast diversity of data from various regions in North America. Currently the program consists of water quality, meteorological, and nutrient monitoring. Let's take a more in-depth look into the multifaceted SWMP.



Data Sonde

Water quality monitoring represents the oldest of the four research areas. The major tool for water quality monitoring is a data sonde. The cylindrical data-recording device utilizes a series of probes to measure a plethora of parameters. These parameters include: 1) dissolved oxygen: the amount of oxygen present in the water 2) pH: a measure of the water's acidity 3) salinity: the water's salt content 4) turbidity: a measure of water clarity and 5) depth. The data sonde's internal memory stores half hour readings taken 24 hours a day, 365 days per year. This yields massive, comprehensive data sets, which may be analyzed for different trends over time, compared with other sites in the same Reserve, or between sites from different Reserves.

The DNERR established its first water quality monitoring site along the St. Jones River in 1995. Months later a second site quickly followed in the northern faction of the Reserve at Blackbird Creek. A third site in the upper branches of the St. Jones River ran for 7 years before the site was discontinued last year. In 2002, a series of new sites were established thus increasing the Reserve's data acquisition potential. Two additional sites were born: one attached to the Lebanon Landing boat ramp and the other near the USGS gauging station along the city of Dover's Division Street. Coupled with the already existing Scotton Landing site, these two St. Jones River sites afford a nice glimpse of water quality along a salinity gradient.

Meteorological conditions affect water quality making it a natural choice for SWMP's second research arm. The St. Jones Reserve boardwalk houses the first weather station. Complex, highly sensitive sensors collect the following data: temperature, rain amounts, wind speed, wind direction, humidity and barometric pressure. This unique weather station feeds directly into the Reserve where it displays real-time weather data for visitors and staff. Users of the world-wide-web may also view DNERR real time meteorological data at: http://www.dnrec.state.de.us/dnrec2000/divisions/soil/dnerr/weather/swmp_0a.html. A second weather station went into operation in August 2002 located near the northern Blackbird component of the Reserve. A unique feature of this station includes an ultra-sonic wind sensor, which the DNERR is evaluating for possible recommendation to the entire NERR system.

SWMP's third research component is nutrient monitoring, a relatively new phase which commenced in January of 2002. The program's goal includes gathering baseline data to assist in understanding the impacts of both urban and agricultural inputs in the watersheds. Nutrient sampling comes in two forms: grab sampling and diel sampling. Grab samples are taken at each of the four data sonde sites. These

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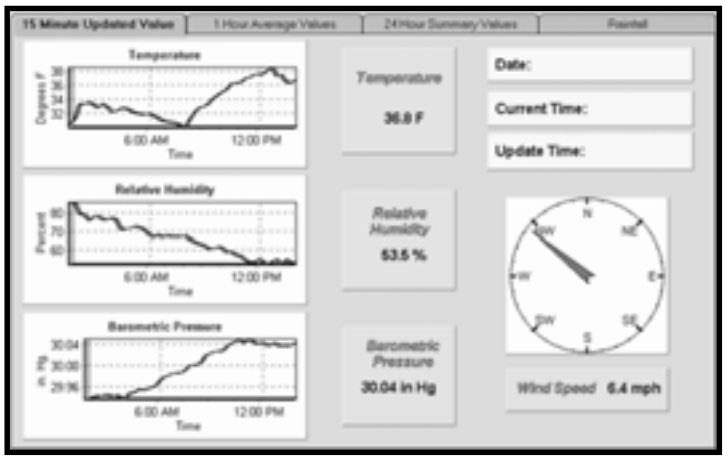
"SWMP" con't.

samples provide a snapshot of the nutrient amounts at the time of extraction. Diel sampling on the other hand, takes into account an entire 25 hour lunar tidal cycle. At 2.5 hour sample intervals, the diel sampling provides us with a much wider lens in which to view the nutrient picture.

Although it appears staff researchers have their work cut out for them, the SWMP periodically expands in an effort to capture as much data as possible, both biotic (living) and abiotic (non-living). As the future unfolds, new projects and sites will be investigated to continue furthering scientific understanding of estuarine environments. Feel free to visit the St. Jones Reserve Center to explore current displays illustrating the ongoing research being conducted by staff scientists.

Mike Mensinger



DNERR real time weather data view from web

2003 Annual Baywide Horseshoe Crab Census

The DNERR would like to thank all of the volunteers who assisted us this year with the Annual Baywide Horseshoe Crab Census at Kitts Hummock, Ted Harvey Wildlife Area, and Bowers Beach. Of the 45 surveys scheduled (15 evenings with 3 beaches per evening) only 6 surveys were not conducted due to weather related events. We had over 100 volunteers from 8 states lend a hand. Volunteers included teacher workshop participants, school classes and clubs, families, individuals, Department of Natural Resources and Environmental Control employees, and assorted scientists. A big thank you goes to our two homeowners at Kitts Hummock who allowed us to access the beach through their properties. Congratulations are extended to Lauren Ahner and Sandie Brennan who were our top volunteers this year, counting crabs on 7 of the survey nights. These ladies were reliable, pleasant to work with, and always willing to fill in if extra help was needed. Many thanks go to Tim Lucas of the Delaware Coastal Programs who contributed the most staff time to evening surveys.

Approximately 75 tagged horseshoe crabs were found during DNERR led surveys. This information was vital to the tagging study being conducted by the United States Geologic Survey. The USGS study was conducted bay-wide to assess spawning migration and population size of horseshoe crabs in the Delaware Bay. Results of the 2003 Baywide Census have not yet been published but will be available at www.lsc.usgs.gov/aeb/2065.

Again thanks to all of those who helped; your assistance is vital to horseshoe crab management in the Delaware Bay. Please call the Reserve if you are interested in volunteering for the 2004 survey.

Katy Lamborn

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Meet the Reserves

Jacques Cousteau National Estuarine Research Reserve

The Jacques Cousteau National Estuarine Research Reserve, at Mullica River and Great Bay in New Jersey, is the only reserve in the national system to be named after an individual. On October 20, 1997 the Jacques Cousteau National Estuarine Research Reserve was dedicated in honor of Jacques Y. Cousteau by Congressman James H. Saxton of New Jersey's 3rd District. Jacques Cousteau produced more than seventy films for television, films which have won numerous Emmys and other awards. Captain Cousteau had also produced three full-length theatrical feature films, and wrote, in collaboration with various co-authors, more than fifty books, published in more than a dozen languages. Captain Cousteau died June 25, 1997, at the age of 87. Congressman James Saxton, a close personal friend of Captain Cousteau, passed a bill officially naming the Mullica River-Great Bay National Estuarine Research Reserve in Cousteau's honor. The Cousteau Society continues his work to protect and preserve the planet for future generations under the leadership of Francine Cousteau and Sir Peter Blake.

The JCNERR is managed by the Institute of Marine and Coastal Sciences at Rutgers University, in partnership with the New Jersey Department of Environmental Protection. These management agencies are guided by an advisory committee that consists of private citizens and community leaders.

JCNERR Teacher Workshop

The JCNERR encompasses over 110,000 acres in southeastern New Jersey, including a great variety of terrestrial, wetland and aquatic habitats within the Mullica River-Great Bay ecosystem. In addition to the ocean environment, the reserve encompasses wetlands, riparian habitats, barrier islands and forested uplands of the New Jersey Pine Barrens. The Reserve is a concentrated patchwork of federal and state lands managed in partnership through a variety of agencies. With little more than 1% of the Reserve subjected to human development, this area is regarded as one of the least disturbed estuaries in the densely populated urban corridor of the Northeastern United States. Occurring within the unique New Jersey Pinelands forest ecosystem, on the coastal plain and the barrier islands of the coastal margin, the Mullica River-Great Bay estuary is of special ecological value. The high environmental quality of the habitats within the Cousteau Reserve are consistent with the objective of the Reserve system to preserve areas which retain a healthy ecosystem and provide the opportunity to serve the needs of long-term research and monitoring programs.

The Jacques Cousteau Coastal Education Center eight miles southeast of exit 58 on the Garden State Parkway in Tuckerton, New Jersey serves as the hub for education and outreach programs associated with the Reserve. The Center is a state-of-the-art facility including a classroom equipped with video conferencing, Internet capable computer workstations, a library of K-12 curriculum materials, and a 16-bed dormitory. Managed by the Institute of Marine & Coastal Sciences at Rutgers University, the Center is designed to primarily serve adult learners including K-12

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PAGE FROM THE NATURALIST NOTEBOOK

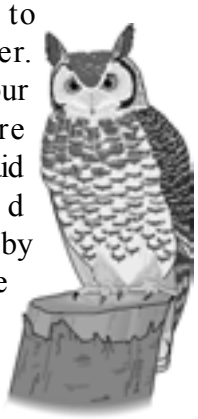
FIELD NOTES

The Great Horned Owl, *Bubo virginianus*, is the largest owl in North America. This owl lives in many different habitats including mountains, grasslands, deserts and conifer forests. The owl is 18-25 inches long with a 53-55 inch wingspan. The average weight of the Great Horned Owl is 3 pounds. The eyes are a distinctive yellow with black pupils. The owl appears to have notable horns on the top of the head but these are large tufts of feathers and are neither horns nor ears. The feathers are gray to brown to black.

During a still night a male can be heard over several miles with its loud, deep "hoo-hoo hoooooo hoo-hoo". Go ahead and try it! Most calling takes place from dusk to midnight and then again just before dawn. This is also the favorite time to hunt since they are mostly nocturnal birds (active at night). They have acute hearing and a sharp sense of sight to aid in their night hunting. Their specially designed feathers allow them to become almost silent fliers. The feathers are designed so as to make very little noise when in flight.

This bird of prey is both large and powerful and capable of catching small mammals for food. Their large, strong talons (claws) are used to catch prey which is usually killed instantly when grasped by the owl. The hunting and feeding patterns of this owl are unique. It can devour whole rabbits or rodents or catch even larger prey more than 3 times its own weight. It will carry off the larger mammals to the nest or a perch where it will rip and tear its catch with its large beak designed especially for this task. Great Horned Owls have also been known to walk into chicken coops or around a farm or pond for chickens, or fish and frogs. Preferred prey are rabbits and hares but they will settle for squirrels, skunks, raccoons, porcupines, armadillos, domestic cats and dogs, moles, muskrats, bats and many others. The owl will eat other owls except the Snowy Owl and will snack on reptiles including snakes, turtles and baby alligators. After eating, the owl will then regurgitate a dark grayish-black pellet which consists of the skull, bones and feathers. These pellets are regurgitated 6-12 hours after eating.

Great Horned Owls do not build their own nest but will utilize an already built nest of another bird. They may also use a squirrel nest or a tree hollow. Nesting season occurs in January or February when the males and females begin hooting to each other. Two to four eggs are normally laid and incubated by the female for 26-35 days. The young cannot fly for 9 or 10 weeks but they will venture out onto branches at 6 or 7 weeks. The young will disperse widely in the fall while the adults tend to stay near their breeding areas year-round. A pair may maintain their territory for as many as 8 years.



This owl may live in captivity for thirty years and up to 13 years in the wild. The greatest threat to the Great Horned Owl comes from man. They are killed by shootings, traps, road kill and electrocution. The only natural enemies are other Great Horned Owls and perhaps Northern Goshawks during nest disputes.

Kate Marvel

MEET THE RESERVES CON'T.

educators and coastal decision-makers. The Center also provides programs for families, senior citizens, and students both at the Center and through one of the Reserve's partners, the Tuckerton Seaport.

Katy Lamborn

FOR MORE INFORMATION:
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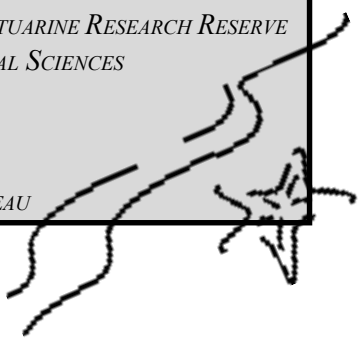

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Conservationist: *Wes Conley*

Estuarine Educator: *Kate Marvel*

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